

Reconfigurable Secondary Composite Building Blocks for Expandable Habitable Structure, Phase I

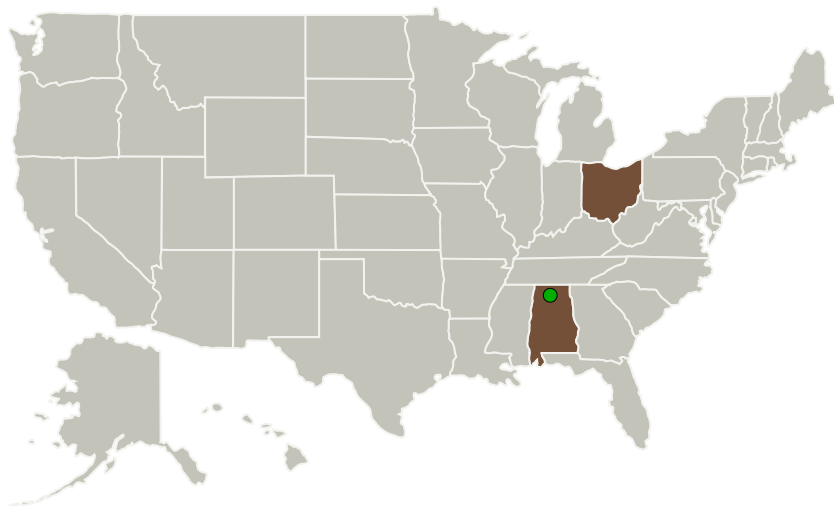
Completed Technology Project (2011 - 2011)



Project Introduction

ZIN Technologies, Inc. will provide a preliminary design showing the feasibility of a Reconfigurable Multi-functional Architecture (RMA) for a deployable floor secondary structure. This will address NASA requirements for innovative deployable secondary structures that have minimal mass, high packaging efficiency, and multi-functional utilization. The primary usage of the floor will be to provide a light weight, deployable walkway for a habitat, which meets the appropriate strength, stiffness, and stability requirements. In Phase 1, ZIN will design, analyze and breadboard the necessary joints to enable the structure to be readily deployed and/or un-deployed, while maintaining the appropriate stiffness. The secondary purpose of the floor will be to take advantage of the walkway's cross sectional geometry and utilize it to provide water storage within the floor. The floor will house electrical and plumbing interfaces, which will connect these utilities between two sides of the module. An addition of electrical outlets within the structure will be provided upon need. Possible features include making the floor reconfigurable to serve as a radiation shield. ZIN will develop universal joints, to enable crew members to disassemble the flooring system and re-assemble it into other secondary or EVA structures. The proposed Phase 1 effort will be geared towards a full scale Phase 2 demonstrator, to show the floor system usage in a relevant environment and raise the Technology Readiness Level (TRL) of RMA structures. The RMA structure we propose will provide a highly robust, stiff and mass efficient surface within a primary structure that will enable the useful outfitting and pre-integration of subsystems within the primary volume

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
ZIN Technologies Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Middleburg Hts, Ohio
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations

Alabama	Ohio
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Project Transitions

**February 2011:** Project Start**September 2011:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/138453>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ZIN Technologies Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Bartlomiej F Zalewski

Co-Investigator:

Bart Zalewski

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Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.1 Lightweight Structural Materials

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System